



# IMPROVE THE SOUND ON YOUR LIVESTREAMS



by Doug Gould, Worship MD

**FOR YEARS, I HAVE TRAINED CHURCH VOLUNTEERS AND** staff audio techs nationwide, focusing on operating live sound systems in the sanctuary. I teach the fundamentals, basics and common-sense approaches that many may not have considered as they have never done this kind of work professionally. Many of the things that help us get a better sound in the sanctuary are different from what we need to know in mixing for a livestream broadcast.

Before the pandemic, every question I received involved mixing live sound. Once the lockdown began in early 2020, every question for the next two years was, “What can I do to improve my livestream audio?” Well, that’s what we’re covering here.



Before jumping into the subject, let me ask you, “Why are you streaming?” Since assembling as a congregation was restricted, streaming technology was called on to enhance the church experience and extend the reach of the teaching pastor to the congregation watching remotely at home. Some churches, mainly the larger ones, have been doing this for a long time and have the experience, the personnel and the equipment to do it well. However, many churches did not know how to make streaming work for them. Starting at square one, they were trying to reach an acceptable level almost overnight and failing.

We know that the primary reason streaming services became necessary was the quarantine during the pandemic. Quarantines and restrictions are over, so why is streaming still so important? What are your reasons for investing in streaming gear or improving the broadcast gear you already have? Are you trying to reach people who don't attend your church? How big is that reach? Is live streaming your ministry worth the monetary and time investment required to continue pursuing excellent broadcast mixes? These are questions you need to answer for your individual church.

In some cases, it may not be worth the expense or effort. For others, it may be the best thing the church has done, and they want to stay on course. It's also true that for many, livestreaming has become part of church outreach, and it's not going away.

Streaming technology connects separate worship centers in real-time, extending church services to multiple locations over public networks. Do these services need to be broadcast live? Even the most experienced professionals can struggle with live broadcasting. Recording services in a high-quality format allow post-event editing and uploading to online systems. This can be a significant benefit and maybe even a better choice.

## **WHERE DO WE START?**

Are you a sound operator responsible for your sanctuary's live sound mix AND broadcasting a livestream mix? If yes, your livestream solutions will differ from those of a church with multiple sound operators responsible for their respective duties. In any case, let's start at the beginning.

Getting the best results for either live sound or recording starts at the source. Great microphones, mixing consoles and engineers can't make bad content sound good, so make sure the sources for your mix — musicians, instruments and the music itself — are as good as they can be before you place a microphone on stage.

- Apply new drumheads and tune them if needed.
- Do the guitars need new strings?
- Is the piano in tune?
- Have the singers warmed up? How is their intonation or rehearsed harmonies?
- Make sure that your gain stages are optimized.

Gain structure refers to how audio signals are amplified and processed within a sound system. It's an important concept for sound engineers to understand because it can significantly impact the quality and clarity of the sound produced.

At its most superficial level, gain structure involves controlling the levels of audio signals throughout the signal chain, from the input sources to the output devices. This typically involves adjusting the gain (or volume) of individual components such as mics, amplifiers and mixing consoles to ensure that the signal levels are appropriate for each stage of the process.



One important principle to remember is that each signal chain component can introduce noise or distortion if the signal level is too high or low. For example, if the input level to a mic is too low, the resulting signal may be noisy and difficult to work with. Conversely, the microphone may clip or distort the signal if the signal is too high.

To maintain a proper gain structure, it's important to adjust the gain of each component in the signal chain so that the levels are consistent and appropriate for each stage of the process. This may involve techniques like gain staging, which consists of adjusting the gain of each component so that the signal levels are optimized for that component.

In general, it's crucial to maintain a consistent gain structure throughout the entire signal chain, from the input sources to the output devices. This will help ensure that the audio signal is clean, clear and free from unwanted noise or distortion and that the overall sound quality is optimized. Apply high-pass filters to every source that requires it.

## **WHERE DOES THE LIVESTREAM MIX COME FROM?**

Many people who run sound for the worship service are also tasked with mixing the livestream. You may even be responsible for monitors, as well. This is a lot to ask of one person; even the most seasoned professional would find it challenging. As a result, you probably send a duplicate of the live mix to the streaming processor. This question then arises: "Why doesn't the livestream sound like the sanctuary mix when heard on the computer, television speakers or my mobile phone?"

You may already know that louder instruments, like drums and guitar amplifiers, don't need as much sound reinforcement as the vocalists. A look at your console will show that the fader positions for louder instruments are typically lower than the vocal channels. That's fine for those in the sanctuary, but people listening online don't hear the ambient sounds. That's why copying and sending the house mix as a livestream without considering acoustical differences can produce a thin, vocal-heavy sound. You need to provide the streaming audience with the feeling of being in that room.

Step one of enhancing a livestream mix involves incorporating congregation or ambient mics into the setup. Use at least two condenser mics, avoiding dynamic or moving coil types, and position them pointing towards the congregation and away from the loudspeakers. If you use cardioid or shotgun mics, ensure that the rear of each faces the stage. The sound you capture from these mics will significantly enhance the livestream mix, providing a more immersive experience for the streaming audience. Congregation mics also contribute by filling in the gaps created by louder instruments in the room, which may be lost in the isolated house mix.

Using two mics is a good starting point, but you may want to add additional ones to get a wider distribution and more dynamic room sound. This one step can make a big difference in your livestream audio quality.

Your worship band may already be using in-ear monitors. If so, they might be using ambient mics to hear the congregation singing in the room. You can add these to your stream mix.



Step two of enhancing the livestream mix is to create a separate mix for your remote audience. The various buses that can be used are:

1. Pre- or Post-Fader Send Aux Bus

Aux buses provide auxiliary mixes separate from the main and subgroup mixes.

2. Subgroup

Subgroups are alternate buses that act much like the Main L+R bus.

3. Matrix Mix

Matrix mixes provide auxiliary mixes created from any bus output and, in some cases, external or channel inputs. A mix of mixes, if you will.

## AUX BUS

Let's start with an aux bus. They come in two basic varieties: pre- or post-fader. Either can be used, but the pre-setting is typically used to create monitor or independent mixes of the main mix. Turning the volume up or down on a pre-fader aux channel will not affect the main mix. For example, if you need more drums in your livestream mix, turn its aux channel up, and it will not affect the mains. (In the next guide, we'll discuss why and when you would use a post-fader aux mix.)

## SUBGROUPS

You should mix with subgroups, not inputs, to make any mixing function easier to manage. Assigning channel inputs to a subgroup on a mixing console involves directing the signals from specific input channels to a subgroup. Subgroups function as a collective control for managing and processing multiple channels simultaneously. This common practice in audio mixing streamlines the handling of various channels. Here's a step-by-step guide:

1. Locate the subgroup section:
  - Find the subgroup section on your mixing console, typically indicated by controls labeled subgroups or groups.
  - Look for the buttons or knobs associated with each subgroup.
2. Select the subgroup:
  - Choose the subgroup you want to assign the channels to.
  - Activate the button or turn the knob associated with the selected subgroup, preparing it to receive signals.
3. Assign channels to the subgroup:
  - For each channel you want to route to the subgroup, locate the corresponding controls on the channel strip.
  - Adjust controls labeled ASSIGN, ROUTE or similar, directing the channel's signal to the subgroup selected in step two.
4. Adjust levels as needed:
  - After assigning channels to the subgroup, fine-tune the subgroup's level control to set the overall volume of all channels within that subgroup.
  - Identify a subgroup fader or level knob and make necessary adjustments.
5. Verify signal flow:
  - Visually confirm the signal flow on the console. Check for LEDs or indicators that illuminate when a channel is sending a signal to a subgroup.
6. Repeat for other subgroups:
  - If you have multiple subgroups and intend to assign channels to separate subgroup channels, repeat the process for each subgroup channel.
7. Test and refine:
  - Play audio through the channels allocated to the subgroups.
  - Adjust subgroup levels and individual channel levels as needed to achieve the desired mix.

Please note that the specific steps for setting up a subgroup on your mixing console may vary. Consult your console's user manual for precise instructions tailored to its features and layout.



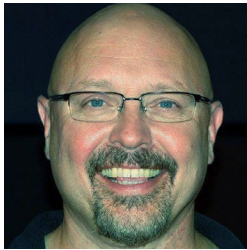
Grouping things like the drum mics, keyboard rigs, multiple guitars and background vocalists into subgroup channels can reduce 32 channels to four or eight subgroup channels, making mixing much easier. (The number of subgroups you can create depends on the specifications of your mixing console.)

Once you've created the subgroups, you can employ a matrix mix — if the feature exists on your console. A matrix mix is basically a mix of mixes (auxes and subgroups). Add your main mix to the matrix to create a matrix mix for your livestream. Now, add those channels you need to hear more of into the matrix, including the drum group, electric guitars, audience mics and any other channel you may need.

That was easy! In a few steps, your matrix mix for the livestream will be created and sound much better. However, remember this is just a starting point. Watch this great video from Yamaha about how a matrix mix works: [Matrix Outputs Explained](#).

## IN CONCLUSION

In the next article, part two, "Livestream Mixing," we will explore more advanced ways of getting the livestream mix to sound how you have always wanted it to sound.



## ABOUT THE AUTHOR

Doug Gould is the CEO and Founder of Worship MD and has been a Pro Audio and Music Technology industry veteran for nearly 30 years, serving in management roles at Shure, Tascam and E-Mu Systems. Doug has served as a worship leader, musician and sound tech at various churches throughout his career.

Over the last 18 years, Doug has been a very effective presenter at hundreds of worship conferences throughout North America and beyond, focusing his experience on consulting and teaching.

## LEARN MORE

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